THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XIII — JUNE, 1940 — No. 6

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Chairman Is Honored at Final Meeting

Retiring Chairman J. A. Macdonald of the Peoria Chapter (at Extreme Left Above) Was Presented With a Diamond Studded A.S.M. Pin at the Meeting on May 13. Next to Mr. Macdonald are J. R. Sommers, the new chairman; C. A. Davis, Jr., executive vice-chairman; and E. E. Alexander, secretary-treasurer.

Western Metal Congress and Exposition To Be Held in Los Angeles in May

At the last meeting of the Board of Trustees it was voted unanimously to hold the Western Metal Congress and Western Metal Exposition in Los Angeles the week of May 12, 1941. This will be the fourth Western Metal Congress and Exposition sponsored by the A.S.M., the previous ones having been held in 1929, 1931 and 1938.

The tremendous increase in industrial activity in the West, together with the extensive growth of the aeronautical industry and the fact that three years will have elapsed since the previous convention, caused the Board to feel that 1941 should be an advantageous and propitious year for another western event.

The Los Angeles Chapter has already organized a general committee and is making plans for another outstanding congress.

The exposition will again be held in the Pan Pacific Auditorium, which proved such an advantageous location and building for the previous show.

A large number of technical societies having representation on the West Coast will participate in the activities, and will have headquarters at the Biltmore Hotel.

The Los Angeles committee in charge of the Congress and Exposition is:

GENERAL CHAIRMAN — A. G. Zima, International Nickel Co.

GENERAL VICE-CHAIRMAN — B. H. Brown, Bethlehem Steel Co.

GENERAL SECRETARY—W. J. Parsons, Pacific Scientific Co.

EXHIBIT COMMITTEE—W. W. Farrar, Farrar Industrial Products Co., *Chairman;* C. E. Burt, Baker Oil Tools, Inc., *Vice-Chairman;* James H. Knapp, Knapp Furnace Co., *Vice-Chairman.*

PROGRAM COMMITTEE—D. S. Clark, California Institute of Technology, *Chairman;* G. A. Gallagher, Los Angeles Junior College, *Vice-Chairman.*

PUBLICITY COMMITTEE—W. A. DeRidder, General Metals Corp., *Chairman.*

INFORMATION & REGISTRATION COMMITTEE—J. E. Wilson, Climax Molybdenum Co., *Chairman.*

ATTENDANCE COMMITTEE—H. R. Abey, Leeds & Northrup Co., *Chairman.*

ENTERTAINMENT COMMITTEE — Harold Etter, Air Reduction Sales Co., *Chairman.*

COOPERATING COMMITTEE OF TECHNICAL SOCIETIES—P. D. McElfish, Standard Oil Co. of Calif., *Chairman.*

Floor plans for the exposition will be ready for distribution about Sept. 1.

Compliments

To **Richard L. Templin**, chief engineer of tests, Aluminum Co. of America, on being awarded an Edward Longstreth medal by the Franklin Institute in recognition of his invention of a deformation recording apparatus.

To **Robert W. Wilson**, patent attorney, on his election as president of the Cleveland Patent Law Association.

To **Alexander L. Feild**, consulting metallurgist and director of chemical research, Rustless Iron and Steel Corp., Baltimore, and vice-president of Alloy Research Corp., on receiving a Modern Pioneer Award of the National Association of Manufacturers, in recognition of his inventions in the process metallurgy of stainless steels.

To **Joseph Victor Emmons**, metallurgist, Cleveland Twist Drill Co., also a recipient of a Modern Pioneer Award.

To **F. L. Meacham**, manager of the household engineering division of the Frigidaire Corp., Dayton, Ohio, on his election as president of the Engineers Club of Dayton.

Peoria Hears Talk About Quality Control of Bearings

By P. E. Nixon

Peoria Chapter — Principal speaker on the program for May 13 was E. P. Kerruish, production engineer in charge of inspection, Cleveland Graphite Bronze Co. Mr. Kerruish spoke on "Quality Control of Bearing Manufacturing".

This was the last in a series of educational lectures on the subject of "Quality Control", during which many outstanding speakers were presented.

Highlight of the meeting was the surprise to retiring chairman J. A. Macdonald, who was presented with a diamond studded A.S.M. pin as a token of appreciation for his untiring efforts during the entire term of office.

Election and installation of officers was also held at this meeting.

Branch of Detroit Chapter Is Organized In Grand Rapids

By Clark E. Wheaton

Last Feb. 19 a branch of the Detroit Chapter of the Society was organized and is known as the Grand Rapids Group. Meetings are held every third Monday of the month, except during the summer, in Grand Rapids, Mich.

Present membership of the Group is 42, with an excellent list of prospective members. Four meetings have so far been held with an average attendance of 55 men.

The subjects covered in these meetings include "Graphitic Pattern in Cast Iron" by R. G. McElwee, Vanadium Corp. of America; "Heat Treatment of Tool Steels" by J. A. Comstock, Surface Combustion Corp.; "Non-Ferrous Alloys" by T. B. Smith, American Brass Co.; "Fabrication of Sheet Steel and Its Application" by A. B. Bixby, Republic Steel Corp.

Officers of the Group are T. M. Snyder, Continental Motors Corp., chairman; R. A. Clark, Lakey Foundry and Machine Co., vice-chairman; and C. E. Wheaton, Continental Motors Corp., secretary-treasurer.

Persons in the vicinity who are interested in attending the meetings of this Group can secure information as to time and place by calling C. H. Lloyd whose name is listed in the Grand Rapids telephone directory.

The Detroit Chapter has two other sections organized in recent years—namely, the Toledo and Saginaw Valley Groups. Separate meetings are held in these regions to accommodate members who cannot conveniently get to Detroit to attend the meetings of the main Chapter.

Officers Visit New Haven

By H. P. Bristol

New Haven Chapter had the pleasure of having two national officers at the final meeting of the year 1939-1940.

Secretary Bill Eisenman told some of his stories, for which he is famous, and spoke informally on the affairs of the Society.

President Jim Gill then gave an excellent talk on "Modern High Speed Steels", which evidenced all the mastery gained by experience, and assurance based on his unsurpassed knowledge of the subject.

A.S.M. to Have 14 Sessions at Fall Congress

Technical Programs of Cooperating Societies Well Advanced; Metal Show Is Largest

The 21st National Metal Congress, to be held in Cleveland Oct. 21 to 25, is showing every indication of being such an outstanding collection of papers as to mark an epoch in the technical sessions of the A.S.M.

The cooperating societies also have their programs well advanced, the American Welding Society having 55 papers to present at their sessions, while the Institute of Metals and the Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers and the Wire Association have planned extensive programs.

The American Society for Metals will have approximately 14 sessions besides the educational lectures in the late afternoon and early evening.

The National Metal Exposition is "going to town". It is at present the largest show that has ever been held in the long history of the Society. Over 235 exhibitors have reserved 90,000 sq. ft. of exhibit space, and three extensions of the "space available" have been rendered necessary by the enormous demand for representation in this exposition.

It has been determined that the theme of this exposition will be "New Aids to Production". This is particularly appropriate at this time in the light of the tremendous activity in national defense and industrial expansion.

The exposition is to be held in the Cleveland Public Auditorium concurrently with the National Metal Congress the week of Oct. 21.

Hotel Statler will be the headquarters for the American Society for Metals, Hotel Cleveland for the American Welding Society and the American Institute of Mining and Metallurgical Engineers, and Hotel Carter will be the headquarters for the Wire Association.

Bain Speaks at First Meeting of New Chapter

By R. S. Crowder

Southern Chapter—The first meeting of the new Chapter was held on the evening of May 28 at the Tutwiler Hotel in Birmingham, Ala. An informal dinner was given in honor of Past A.S.M. President E. C. Bain of U.S. Steel Corp., who later gave the technical address.

After a short business session and review of the progress of the Chapter by Chairman James T. MacKenzie the meeting was turned over to Robert Gregg, president of the Tennessee Coal Iron & RR. Co., who introduced Dr. Bain.

Dr. Bain's talk on "The Functions of the Alloying Elements in Steel" was eagerly received by the 150 members and guests of the Chapter. The speaker left with his audience a much clearer view of this important field.

This meeting was the fulfillment of a long-felt need in this district, and with the impetus of Dr. Bain's send-off great things may be expected from and by the Southern Chapter.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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Trojan Horses and Fifth Columns Battle At Columbus Outing

By R. E. Christin

Columbus Chapter — Recreation was the order of the day at the regular monthly meeting held on May 25, at the Schultz Club, Groveport Pike.

The soft ball contest was between two teams, the Trojan Horses, captained by robust and rotund Lou Colby of the Houghton forces, and the Fifth Columns, captained by Ernie Christin of the Columbus Bolts.

Needless to say the score was censored, though it did leak out that the F.C.'s were ahead some 60 to 7 when the ball bat was reported broken by means of sabotage and the drive was ended with protests from the observers.

Some of the outstanding feats of the game included the fleetness of foot of Doc Lorig, the bat-breaking activities of one Allen Ward, member of Golden Gate Chapter, and the swell pitching of Captain Colby who gave the Fifth Columnists all the information they wanted in running up the score.

It was also said that Big Bill Welcker performed so stoically at bat and at first base, that a certain liniment company is seeking him for testimonials.

After the "eats", an election was held which gave the office of chairman to Doc Lorig of Battelle, vice-chairman to Dan Krause, also of Battelle, treasurer to Chas. Thomas of Jeffrey Mfg. Co., and secretary (for the 4th term) to Ernie Christin of Columbus Bolt Works.

Dr. Sam L. Hoyt of Battelle, who has been chosen for the next Campbell Memorial Lecturer, then gave the members a most enjoyable time with his "Reminiscences". These covered his close contacts with many internationally known men in the metallurgical field, such as Howe, Campbell, Desch, Rosenhain, Schultz, Hanneman and Hanneman, Martens, Portevin, Hadfield and Hatfield, Merica and many others.

None of those who heard this talk would hesitate to have it repeated in its entirety so as to include the American deans, Jeffries, Sauveur, Campbell and others. These names mean so much more when Sam Hoyt discusses them in most intimate terms, describing his experiences with these men in Germany, England, Belgium, France, Italy, at Schenectady, Milwaukee, and University of Minnesota.

Van Deventer Speaks at Boston Sustaining Members' Night

Sustaining Members' Night Held by the Boston Chapter on April 5 Found (Left to Right) George Burnett, Chairman of the Program Committee; John H. Van Deventer, Editor of "The Iron Age"; Arden L. Knight, Chairman of the Boston Chapter; R. F. Harrington, Vice-Chairman; and John T. Norton, Member of the Executive Committee.

Editor Discusses Relation of American Business and World Trade to the War

By J. V. Baxter

Boston Chapter—Declaring that the end of the current European War would not terminate the war for world trade but would intensify it, John H. Van Deventer, editor and president of *The Iron Age*, speaker at Sustaining Members' Night on April 5, warned that American business men must be prepared for terrific post-war competition.

Citing the changes caused by post-wars, Mr. Van Deventer said that even if America remained neutral it could not be isolated from the economic impacts of the current war. If America "stuck its head in the sands of isolation" and erected higher tariff walls it would lose the trade of neighboring countries, particularly in South America.

He warned that this would lead to the penetration of foreign business men in South America, with the penetration subsequently of foreign politicians. Ultimately this would constitute a military threat to the United States.

Addressing a capacity audience as "you fellows who cannot let well enough alone," Mr. Van Deventer asked "What is going to happen to the government and business after the War?"

With 65% of all the gold in the world concentrated in the United States, is it going to be good after the War? The effect of the War at present is to produce a buyer's market, but what will happen when it changes to a seller's market?

Prepare for Post-War Adjustment

The important thing to keep in mind is the inevitable post-war adjustment and prepare for it.

In 1914 London was the financial center. Today it is in the large cities of the United States, such as New York, Chicago and Boston.

In 1914 we had two billion dollars in gold. In 1940 we have 18 billion.

In 1914 the federal debt was $1,000,000,000. In 1940 it will be close to 45 billion dollars.

After the War, with the government concentration of gold, private enterprise will be weakened as contrasted with political power, with the tendency toward a regimented economy.

We are preparing Europe to be in a position to compete seriously with us by selling them tremendous quantities of machine tools now being used for munitions, but after the War the tremendous over-expansion of plant will aid them in a competitive situation, assisted by a low labor rate. All of our European trade advantage will melt away under the wave of low cost competition.

Mr. Van Deventer admonished the United States to keep out of the War. It cost us 42 billion dollars for the last World War. There will be no white rabbits to pull us through the coming crisis.

Individual Initiative Needed

Go back to the good old American way of doing business, not the way the New Deal is doing it. Go back to the time, before the War, when the relations between capital and labor were the envy of all European nations.

Go back to the American way and take the next upward step. We have all the ingredients that are necessary only they have been kept on the shelf too long.

Give America something better—the underlying principle of democracy, individual initiative. What a responsibility, what a privilege, and what an opportunity for you "improvers", said Mr. Van Deventer.

Following the dinner, R. F. Harrington introduced the sustaining members. The Army, Navy, and the Marines were represented at the head table in the persons of Col. R. W. Case, commandant, Watertown Arsenal; Rear Admiral W. T. Tarrant, commandant, Boston Navy Yard; and Prof. John T. Norton of M.I.T., a former marine.

New Jersey Idea Spreads Abroad!

New Jersey Chapter might well be proud of its "Stump the Experts" meeting which was reported in the March issue of THE REVIEW and has attracted attention abroad.

An editorial column in *The Metal Industry* (London) for May 24, discusses "those diabolically ingenious parlour games which always emphasize how little we seem to know about things in general . . . . ."

Says *Metal Industry:* "A recent issue of THE REVIEW, published by the American Society for Metals, shows that metallurgists have at last fallen victims to this habit of asking awkward questions. The New Jersey Chapter of the Society organized a 'stump the experts' meeting, at which six unfortunate if distinguished metallurgists faced up to a battery of questions from the audience. After a series of genuine questions had been answered successfully there came the trick questions, with a reward of one dollar for stumping the experts, but to the lasting glory of the six New Jersey metallurgists only five dollars apparently had to be paid out. Harassed honorary secretaries of local sections may adopt this idea for next session . . . . ."

Puget Sound Member Gives Metals Course To Aircraft Workers

James L. Avis, consulting metallurgical engineer, and member of the Puget Sound Chapter, reports a very successful evening course in physical metallurgy which he presented last winter mainly to members of the Boeing Aircraft Corp.

The students were mostly production men, engineers and inspectors and evinced considerable interest and enthusiasm.

The course started with a review of iron mining, smelting and refining and a discussion of physical vs. process metallurgy. Mr. Avis then lectured on crystallization and elementary features of the iron-carbon diagram.

The sixth lecture was a more practical discussion of the ferrous and nonferrous metals used in aircraft production.

A unique feature of the course was an evening devoted to the clearing up of certain misconceptions such as the explosion of the belief that "vibration crystallizes and embrittles", and such misnomers as semi-steel, half-hard, passivate, etc.

One entire evening was devoted to a quiz and open forum, while another was given over to showing of lantern slides illustrating the course.

Pyrometry Fundamentals Are Discussed at Oregon

By B. F. Sawyer

Oregon Chapter—Sixty-one members and guests were present when Chairman Peck called the meeting to order on May 10, 1940.

As the first order of business, Mr. Peck presented Prof. C. E. Thomas with a gift from the Chapter in appreciation of his conduct of the educational course during the past year.

Mr. Healy was then called on to introduce the speaker, Russ Knoblauch, chief engineer, Industrial Sales Department of the Brown Instrument Co. Mr. Knoblauch spoke on "Fundamentals of Pyrometry and Automatic Temperature Control and its Application to Metallurgical Processes".

He discussed the theory and practical application of thermocouples of the iron-constantan, Chromel-Alumel, and platinum, platinum-rhodium types, and of measuring instruments of the millivoltmeter and potentiometer types. He also dealt with several methods of automatic control of temperature.

Mr. Knoblauch's talk was illustrated with some interesting slides covering these instruments.

New England Chapters Hold All-Day Session

Inspection Trips, Technical Session and Banquet Feature Program of Six Chapters

By G. G. Wilcox

On Friday, May 17, Hartford Chapter acted as host to the annual New England regional meeting of the Boston, Hartford, New Haven, Rhode Island, Springfield, and Worcester Chapters.

The activities of the day began at 9:00 a.m. with registration at the Hotel Bond. Soon busses and private cars were leaving for the first scheduled plant visitation at the Underwood Elliot Fisher Co., where the many interesting operations involved in typewriter manufacture were observed.

Following an hour for lunch, those whose feet were still in good condition inspected the new and modern plant of Pratt & Whitney Division of Niles, Bement, Pond Co.

Morris and Wyzalek Are Speakers

At 3:00 p.m. the technical session began at the Bond Hotel. The first lecture was by M. J. R. Morris, chief metallurgical engineer of Republic Steel Corp. Mr. Morris's subject was "Selection of Alloy Steels".

While this was a very broad field, the speaker aroused much interest by his practical and specific treatment of some rather definite applications.

Following this came a talk by J. F. Wyzalek, chief metallurgist, Hyatt Bearings Division, General Motors Corp., on "Gas Carburizing".

This lecture was of a general nature covering the historical background of the subject as well as modern methods and applications. Many lantern slides illustrated different kinds of equipment employed for gas carburizing, mostly on automotive parts.

C. J. Hewitt, of Fafnir Bearings Co., presided as technical chairman, and led a good discussion period after each lecture.

Following the technical session, and an hour or so devoted to the lighter things of life, the clans again assembled in the hotel ballroom for the banquet, at which about 300 were present. Souvenirs donated by sustaining members and others were distributed at the tables, and much frivolity and good singing were enjoyed, led by Don Sawtelle, with Walter Dawley as accompanist at the Hammond Organ.

Hartford Times Features A. S. M.

The banquet was just getting under way when free copies of a special edition the the *Hartford Times* were distributed throughout the hall. This edition gave much publicity to the regional meeting, containing several pages devoted exclusively to A.S.M. activities. Matters which were featured included a history of the Hartford Chapter written by J. C. Kielman and C. J. Hewitt. Many photographs of officers, committees, and guests appeared in this special edition.

Following the banquet, Hartford Chapter Chairman C. J. Umlauf, presiding, announced the results of the recent election of officers.

Guests were genial National President Gill, accompanied by equally genial and ubiquitous National Secretary Eisenman. After being regaled by their account of their peregrinations about these United States and the back-handed compliments they tossed each other, a few inspiring remarks were made by C. R. Burt, president of Pratt & Whitney Division, about the new plant.

Guest speaker of the evening was W. A. Dower, executive vice-president of the Hartford Chamber of Commerce, who spoke on "Industrial Preparedness", particularly in its relation to the uncertain national situation.

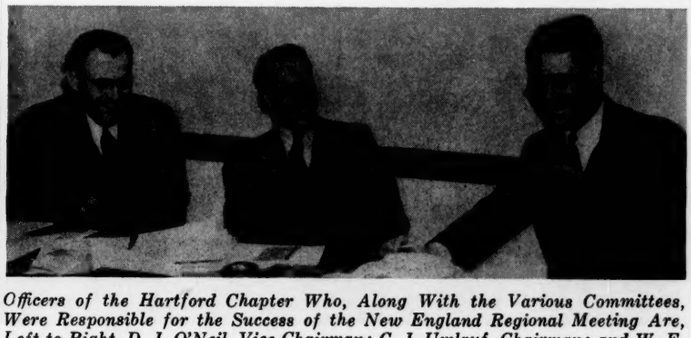
Provision was made during the day's activities for the entertainment of the lady visitors who enjoyed a sight-seeing trip to the State Capitol building, the Aetna Life Insurance building, and Elizabeth Park, then attended a theater party, winding up with dinner and a floor show at the Lobster Restaurant.

Those of the men who wished to play golf during the day had an opportunity to do so at the Wampanaog Country Club.

The total registration for the day was about 400.

The officers and committees deserve much credit for the meeting.

Hartford Men Hosts at Regional Meeting



Officers of the Hartford Chapter Who, Along With the Various Committees, Were Responsible for the Success of the New England Regional Meeting Are, Left to Right, D. J. O'Neil, Vice-Chairman; C. J. Umlauf, Chairman; and W. E. Bancroft, Secretary-Treasurer. Shown below are the officers of the Executive Committee: Standing, left to right, E. H. Casavant, D. F. Germaine, R. J. Haigis, F. F. Harter, W. F. Hoerle, D. M. Jack, and W. H. Richardson; seated are E. A. Sanford, G. M. Seibert, G. G. Wilcox, R. W. Woodward, J. C. Kielman, and C. J. Hewitt.

60% of Large Steel Castings Are Made of Open-Hearth Steel; 31% From Electric Arc

By E. P. Epler

Calumet Chapter — Explaining the reason for the use of various steel making methods, molds, casting treatments and various methods of testing, Charles W. Briggs, technical adviser, Steel Founders Society of America, spoke on the "Manufacture and Testing of Steel Castings" at the March 20th meeting.

Mr. Briggs said that approximately 60% of the large steel castings are made from open-hearth steel. Acid open-hearth is more commonly used since the refractory cost is low and the FeO content can be well controlled through the use of manganese ore additions.

Almost 31% of all steel castings are made by the one-slag electric arc process. Here again the acid process is more common due to low refractory cost and short melting and refining times.

A well-made acid steel has a high fluidity which is desired for casting. Within certain limits the fluidity of the steel increases with an increase in the FeO content in the slag.

Some castings are made of steel from the side-blown Tropenas converter which makes hotter steel than is possible with the bessemer converter.

The electric induction furnace is becoming more popular for high alloy steels in small heats of approximately 100 to 300 lb. The use of the crucible furnace is gradually declining.

Mold Requirements

Good molds for successful steel castings must have the following five properties: High temperature resistance, erosion resistance, easy cleaning, ability to hold shape, and permeability.

Molding materials most commonly used consist of washed silica sand with clay for binder or natural bonded sand.

A good core is made of sand plus a suitable binder and must be able to break down at the proper time in order not to cause injury to the casting as it shrinks during cooling.

On removal from the mold, the castings are trimmed of gates and risers either by torch or cold saw and then cleaned by shot blast, sand blast, hydroblast or tumbling, depending on the size of the casting.

After cleaning, the castings may be full annealed, normalized and drawn, quenched and drawn, or differential quenched.

Mr. Briggs stated that cast steels are as readily welded as wrought steels.

Testing of castings ranges from destructive tests such as drop ball impact and cold saw sectioning to the non-destructive radiographic tests such as X-ray and gamma ray for interior defects and the magnaflux for surface defects.

Castings that are to be used for fluids and gases are subjected to the hydrostatic pressure test.

At the conclusion of his talk Mr. Briggs showed a number of slides which illustrated his most important points. The great interest in the subject was displayed by the lively discussion period which concluded the evening's activities.

Members Will Vote Changes In Constitution

Sections Defining Membership Classifications Affected by Proposed Changes

Conforming with the regulations in the Constitution, this is the official notice that the following proposed changes to the Constitution of the A.S.M. are to be presented for a vote at the Annual Meeting of the Society to be held at Hotel Statler, Cleveland, Oct. 23, 1940. The proposed changes are shown in capitals.

Article I, Section 2 (a) now reads: A Founder Member shall be such person as the Board of Trustees shall determine has been instrumental in the founding of the Society or has rendered distinguished service to the Society.

This is to be changed to read as follows: A Founder Member shall be such person as the Board of Trustees shall determine has been instrumental in the founding of the Society AND has rendered distinguished service to the Society.

Article I, Section 2 (b) now reads: An Honorary Member shall be such person as the Board of Trustees shall determine is of acknowledged exceptional eminence. The total number of Honorary Members shall not exceed twenty-five (25) at any one time.

This is to be changed to read as follows: An Honorary Member shall be such person as the Board of Trustees shall determine HAS MADE EXCEPTIONAL CONTRIBUTIONS TO THE FIELD OF METALLURGY. The total number of LIVING Honorary Members shall not AT ANY TIME exceed twenty-five (25).

Article III, Section 2 now reads: The annual meeting of each local Chapter shall be held in the month of May of each year. The fiscal year of each local Chapter shall begin on the date of its annual meeting.

This is to be changed to read as follows: The annual meeting of each local Chapter shall be held in the month of APRIL OR May. The fiscal year of each local Chapter shall begin on the date of its annual meeting.

Article V, Section 7 now reads: Any member who shall have paid his dues for thirty-five (35) years, or who having paid his dues for twenty (20) years shall have reached the age of seventy (70) years, shall thereafter be exempt from the payment of further dues.

This is to be changed to read as follows: Any member WHOSE DUES SHALL HAVE BEEN PAID FOR thirty-five (35) CONSECUTIVE years, or WHOSE DUES SHALL HAVE BEEN PAID FOR twenty (20) CONSECUTIVE years AND WHO SHALL HAVE REACHED THE AGE OF seventy (70) years, shall thereafter be exempt from the payment of dues. WITHIN THE MEANING OF THIS SECTION, REPRESENTATIVES OF SUSTAINING MEMBERS SHALL BE CONSIDERED AS MEMBERS.

Aircraft Progress Is Dependent on Metal Says Woldman

High Quality, Close Specifications, Premium Prices Characteristic of Aircraft Industry

By Fred P. Peters

New Jersey Chapter—Thousands of new planes needed by the government —and hundreds of metals needed by the plane designers! That's the general feeling Dr. N. E. Woldman, chief metallurgical engineer, Bendix Aviation Corp., left with the 250 metal men who heard his timely "Aircraft Metallurgy" lecture at this Chapter's 100th meeting on May 20.

Kaleidoscopically (as ever), Dr. Woldman called the roll of metals and alloys that have become so vital to the mushrooming aircraft industry. Aluminum alloys, magnesium alloys, stainless steels and the S.A.E. alloy steels are the "glamour names" in aircraft but there are many, many individually different materials of these general types and lots of other metals of specific importance in airplane design.

High quality is characteristic of the aircraft industry. Close specifications and premium prices apply to the metals used, as to all aircraft raw materials, and "aircraft quality" is much more than a catch phrase, as anyone supplying the industry with anything will ruefully testify.

In a given instance, the "aircraft quality" grade may be actually no better than the ordinary grade, but it represents more rigid and more frequent inspections and highest possible uniformity.

Of all considerations applied to materials for use in planes, the familiar strength-weight ratio is most important. The fact that there are other factors—availability of the material, its cost, the relationship of this cost to the type and size of plane, the coefficient of expansion of the material, its modulus of elasticity, weldability, impact strength, often makes compromises necessary in choice of materials.

Because of this, and perhaps fortunately, more than one material can be used with equal success in many individual applications, with the preference going to the material with which the designer is most familiar.

Propellers are now made of aluminum alloys, ordinary low alloy steel, 18-8 stainless, or wood. Aluminum alloy (24S-T) forgings are being superseded in many cases by hollow blades of nickel-chromium-molybdenum steel, with chromium-vanadium also used.

52 S Aluminum Alloy Popular

An increasingly popular aluminum alloy, particularly for cowlings and similar applications, is 52S (2.5% Mg, 0.25% Cr), which offers higher fatigue strength than many of the more familiar aluminum-base materials. Firewalls are also often made of this alloy, in the form of 0.032 to 0.040-in. sheet.

A new type of firewall construction consists of an "asbestos sandwich"—two sheets of aluminum alloy between which is a layer of sheet asbestos. Stainless 18-8 (or even terne plate) is also used in firewalls.

The "battle of the fuselage" still continues between the aluminum alloy stressed-skin monocoque construction and chromium-molybdenum alloy steel tubing (X4130) welded construction. (The latter is also highly popular for engine-mount supports.)

Aluminum alloy forgings and chromium-moly steel forgings also compete for landing gear fittings. Stainless 18-8 for fuselage frame or covering is gaining favor.

Wing structures are massive and well reinforced, with aluminum alloys and wood-fabric still more popular than stainless for basic construction, although the popularity of wood (spruce) is rapidly declining in favor of metals. Wing beams on new planes, for example, are more likely to be made of X4130 steel, 18-8 stainless or 17S-T or 24S-T aluminum alloy than of wood.

Inconel shows much promise for exhaust manifolds and has been accepted by the Navy for this application. Columbium or titanium-bearing 18-8 is also very popular for manifolds.

Monel is used for many small but important applications — for seaplane pontoons, K-Monel for non-magnetic tubes and rods near the instruments, and in certain engine parts.

Various Metals Used in Engines

Aircraft engines, largely through improved design and with the help of the metallurgical engineer, now have a weight-power ratio of about 1.1 lb. per h.p., as compared with 2.5 lb. per h.p. some years back.

One well-known engine manufacturer states that aluminum alloys constitute 42% of his engine, magnesium alloys 7% and copper alloys 4%, the other 47% being ferrous metals.

Nitralloy cylinders are almost universally used, with aluminum alloy heads and blocks (Y-alloy or Alcoa 142) most popular. Cylinder heads and blocks often receive an aluminum-metal spray finishing. For pistons, too, forged aluminum alloys are most popular.

Generally speaking, the most popular ferrous metal in aircraft engines is the nickel - chromium - molybdenum S.A.E. 4340 (or X4340) steel.

Officers Elected at Annual Meeting of Buffalo Chapter May 9

The Annual Meeting of the Buffalo Chapter on May 9 Featured an Excellent Dinner at the Hotel Buffalo, Followed by Election of Officers and a Floor Show. Some of the officers were photographed in front of a huge A.S.M. emblem. They are, left to right, Norman Graf and Walter Esau, members of the Executive Committee; John E. Jacobs, vice-chairman; R. C. Spencer, retiring chairman; L. N. Stetson, new chairman; J. H. Birdsong, secretary; Thomas J. Woods, member of Executive Committee; and George F. Roeder, past chairman (1938-39).

Oregon Elects Officers, Hears Annual Reports

By B. F. Sawyer

Oregon Chapter — Ninety-six members and guests attended the dinner meeting on May 17. In a business meeting following the dinner, the annual reports of the secretary, treasurer and chairman of the program committee were presented, and new officers were elected.

A drawing for door prizes of five free dinners was likewise held and Don Johnson, who has handled publicity for the past year was presented with a handsome pen and pencil set in appreciation of his efforts.

Captain Edward Garbutt of the United Air Lines then gave an interesting talk on "Modern Airline Instrument Navigation". The last item on the program was entertainment consisting of several acts of vaudeville.

Aluminum Bronzes Give Unusually High Physical Properties

By Eric Crawford

Montreal Chapter successfully closed its season's activities at the Annual Meeting held April 22.

The guest speaker for the evening was George K. Dreher, plant manager of Ampco Metal, Inc., and chairman of the Milwaukee Chapter A.S.M.

Mr. Dreher spoke on aluminum bronze in an interesting and comprehensive manner, starting with the equilibrium diagram of the copper-aluminum alloys and concentrating on the generally accepted compositions, their structures and physical properties as affected by small additions of such elements as iron, nickel, manganese and zinc on the ultimate phases of the alloy.

In view of these phase differences, it is a fallacy to use chemical specifications since the same chemical analyses may be found in different phases but accompanied by quite different physical properties.

Remarkably high physical strength may be secured in these metals, up to 85,000 psi. ultimate and 40,000 psi. yield without heat treatment, and 108,000 psi. ultimate when properly heat treated.

They may be cast, forged, extruded, or rolled, and centrifugal castings are of exceptionally high quality.

In ordinary sand castings, the metal cools from both inner and outer surfaces; the growing crystals tend to force impurities and residual phases ahead by the pressure of the metal fed through the shrink head. This force opposes the advancing crystallization.

In a centrifugal mold, the metal is subject to a spiral formation under a pressure of 66 psi. compared with 1.62 lb. in a similar sand casting.

Impurities are thrown to the inside and crystal growth is in one direction, from the outside inward. Each particle of metal is packed into place by a force equivalent to the hydrostatic pressure of a riser 20 ft. high.

Commercial applications of the aluminum bronzes extend over a wide range of products, notably for corrosion resistance and wear resistance. They are used for airplane parts, dies (especially for stainless steel), and for non-sparking tools such as wrenches and screw-drivers for use under highly inflammable or explosive conditions.

A colored talking picture describing the Ampco plant and its operations was a delight in both its production and its depiction of plant operations, and sets a new high in emphasizing the usually unsuspected glamour of the foundry.

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This book, however, is not just another general review of the well-known metallurgical fundamentals. The section on constitution of alloys contains over 160 equilibrium diagrams, while the chapter on deformation of ferrous and non-ferrous metals and alloys contains important material never before published in this country.

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Metallographer Needs Patience In Polishing

Distorted Metal, Commonest Shortcoming, Is Remedied by Repeated Polishing, Etching

By Walter G. Patton

Detroit Chapter members who have long admired from afar the photomicrographs produced by J. R. Vilella and his staff in the U.S. Steel Research Laboratories at Kearny, N. J., were given an opportunity on May 15 to learn first hand how work of such outstanding quality is produced.

As expected, a record crowd was on hand; probably a new attendance record for this season was established.

Mr. Vilella easily met the eager expectations of his audience. The talk was so well organized, the illustrations so apt, that many listeners probably felt that all that is necessary to become a good metallographer is to follow Vilella's instructions implicitly and work like the devil at the job—as he has so evidently done.

Sorbite Mistakenly Identified

Although Vilella's talk has been reported several times in THE REVIEW, the speaker's standing as a metallographer and the interest in the subject seem to warrant a few additional points.

The most common shortcoming in metallographic preparation, according to Vilella, is the presence of distorted metal which often obscures the true structure. By means of slides the speaker made this point very plain, emphasizing that the remedy is usually a strong inoculation of patience—polish, etch, repolish, re-etch, etc.

The structure of steels (other than those quenched and tempered) sometimes referred to as sorbite is probably improperly polished pearlite 90% of the time, the speaker said. He also pointed out that low carbon molybdenum steel often exhibits a precipitate which can be totally obscured by improper polishing.

18-8 Difficult to Polish

Low carbon 18-8 is one of the most difficult metals to polish correctly, because of difficulties involved in removing the layer of disturbed metal which is generally present.

Vilella suggested that electrolytic polishing often offers a satisfactory solution to the metallographic problem associated with these compositions.

He pointed out, however, that this method, while it brings out the structure quite satisfactorily, leaves something to be desired with respect to inclusions. There is a tendency for the inclusions to stand out in relief when the electrolytic method is used, giving an unwarranted dirty appearance to the steel.

Vilella devoted considerable time to the subject of etching reagents. In his opinion, nital and picral definitely are not interchangeable. Nital is particularly sensitive to grain orientation, whereas picral etches more evenly. Picral, he observed, is particularly desirable at high magnification; it gives good contrast because it discolors the specimen slightly.

"Tremendous Trifles" Discussed

Considerable time was devoted to a discussion of what might be referred to as the "tremendous trifles" of metallography. For instance, bainite and fine pearlite (nodular troostite), which actually possess a slightly different etching rate and therefore can be identified in properly etched specimens, are often indistinguishable in over-etched specimens.

Also what is correct etching for low magnification is not usually the right etch for high power work.

The speaker presented a series of pictures showing how microscopic cracks can be detected by polishing, oxidizing at 1000° F. in lead for one hour and observing at 1000 magnifications. After this treatment, the presence of cracks may be ascertained by locating the decarburized areas. (Such cracks would not be observed by simple polishing.)

In the lively question and answer period which followed, ferrite vs. austenitic grain size, polarized light, color photography and the proper interpretation of the structures of several high temperature steels were discussed.

An innovation at the meeting was the substitution of a 25-min. get-acquainted and visiting period for the customary coffee talk. Apparently the Chapter appreciated the change in routine.

Former Team-Mates Head Texas Chapter

Texas Chapter's New Officers, Charlie Lewis (Left), Secretary-Treasurer, and Wade Hampton (Center), Chairman, Served the Los Angeles Chapter in the Same Capacities at the Same Time Some Ten Years Ago. George Harrington (Right) Is the New Vice-Chairman of the Texas Chapter.

Machinability Is Gill's Subject in Montreal

By Eric Crawford

Montreal Chapter — The regular monthly meeting on April 1 was designated as "National Officers and Past Chairmen's Night", for the Chapter had the distinction of completing the tour of President James P. Gill, and Secretary W. H. "Bill" Eisenman.

Past chairmen of the Chapter were guests at the dinner preceding the evening session.

Our genial secretary, Bill Eisenman, in an introductory address, informed the meeting of the progress of the Society. Every member may well be proud to belong to such a progressive organization, and be appreciative of the excellence of its leadership.

For some unexplained reason, Bill was not on deck when the train pulled into Windsor Station and was very nearly shunted to the yards—then, too, he got mixed up between Montreal and Toronto so we wish to remind him that they are really two different places. (Perhaps all this may be attributed to the first of April.)

Mr. Gill addressed the meeting on the "Machinability of Metals", illustrating his lecture with slides. The physics of cutting, the quality of cut and the many compositions of high speed tool steels were covered in a manner which enabled the layman and the technician to enhance his knowledge of the subject.

Mechanical Tests Reviewed Points of Caution Given

By F. H. Craven

Notre Dame Chapter — The April meeting brought R. L. Templin, chief engineer of tests for the Aluminum Co. of America, to speak on "Mechanical Property Tests of Metals".

Mr. Templin is one of the leading authorities in this field. He came into the metallurgical field through his work in civil and mechanical engineering with various private concerns and with the National Bureau of Standards.

Needless to say, the speaker presented a discussion that was greatly appreciated by his audience. Mr. Templin thoroughly considered all the commonly used methods of determining the physical condition of metals, giving points of caution in their use and evaluation of results obtained.

Mr. Templin discussed the difficulties encountered in arriving at suitable design stresses for structural members and presented data showing that at the present time it is necessary to test the entire member for reliable results.

Manufacture of Shells Shown in Movies By War Department

By Charlie Lewis

Texas Chapter held its last meeting of the year on May 31. Dinner was served to about 125 men and about 50 more came in to see two motion pictures used by the War Department for training and loaned to the Chapter through the courtesy of the Corps Area Signal Officer.

The first showed the manufacture of the 3-in. anti-aircraft shell. Our regular visitor, Harry McQuaid of Republic, recognized the locale as the Frankfort Arsenal. The reel lasted about 40 min. and carried the shell from the billet cut-off saw into the carton being shipped for loading.

For the benefit of those who haven't seen these shells being made, the steel used is S.A.E. X1335 normalized.

The blanks are heated in an induction furnace and forged in double units. The trimming is done hot and the forging allowed to cool in air.

Fully automatic machinery is used throughout, for not only must dimensional tolerances be observed, but there is a weight tolerance as well. This is for ballistic reasons. The light ones will go long, while the heavy ones will fall short.

The second picture, showing the anti-aircraft regiment in action, was quite spectacular. Aside from the curious mixture of old 1912 Dodge cars and new four-wheel drive Marmon-Herringtons, the equipment and tactics shown were very modern.

This meeting was enjoyed thoroughly until the business session, when the treasurer reported an operating loss for the year. However, when it was found that this was due to educational work that had accounted for some 18 new members, all was forgiven.

New officers were announced and took over for next year. By a strange quirk of fate the new chairman, Wade Hampton, and the secretary, Charlie Lewis, served in these same capacities together for the Los Angeles Chapter in 1928-29. With two such old-timers running the show, great things are expected for next year.

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Welding Torches
Innumerable flame hardening nozzle sizes and types are required to cover the wide range of the flame hardening and flame softening processes. Victor Equipment Co. has information concerning the many types of nozzles it manufactures, each designed to fit onto the standard Victor welding torch butt. Bulletin R-209.

Aluminum Castings
A new aluminum casting alloy is announced by the National Bronze and Aluminum Foundry Co. of Cleveland. Known as the T-1 aluminum alloy, it has a tensile strength up to 33,000 psi. without heat treatment. A folder gives complete data, composition and detailed information. Bulletin R-210.

Beryllium Data
First of a series of enginering data sheets issued by the Beryllium Corp. of Pennsylvania covers the subject of one of the beryllium alloys very completely (Berylco No. 25, beryllium copper), giving physical properties, heat treating data and other information which is of utmost interest to all people in the design or engineering fields particularly. Bulletin R-211.

No Decarburization
A low cost method of hardening and annealing under production conditions with no decarburization is described in technical data available through Westinghouse Electric & Mfg. Co. Bulletin Fd-134.

Pyrometers, Furnaces
Two new broadsides issued by Leeds & Northrup will be of value to those interested in indicating, recording, or controlling industrial temperature, as well as heat treating furnaces. Bulletin Fd-46.

Nickel Alloy Steels
Typical nickel alloy steels and cast irons employed in Diesel engine construction are charted in a folder by the International Nickel Co. Bulletin Fd-45.

Eutectrol Carburizing
Actual operating data and pictures of the Surface Combustion Eutectrol furnaces are included in a colorful folder just released. Bulletin Fd-51.

Stainless Steels
A wealth of information on Republic ENDURO Stainless Steels is contained in a new booklet issued by Republic Steel Co. Bulletin Fd-8.

Brazing Silver Alloys
A new and colorful folder just released by Handy & Harman is full of interesting pictures showing how metals can be joined with better, more economical results with SIL-FOS and EASY-FLO. Bulletin Fd-126.

Stainless Electrodes
Helpful material on the selection of correct electrodes for electric arc welding of Stainless Steels is contained in a new folder by the Crucible Steel Company of America. Bulletin Fd-56.

Tool Steel Selector
A new chart of Tool Steel Recommendations which helps you select the Best Steel for each tool is available through the Jessop Steel Co. Bulletin Fd-173.

Instruments
A very colorful brochure which describes "Bristol's 50th Anniversary Instruments" illustrates many interesting developments. Available through the Bristol Co. Bulletin Fd-87.

Electric Furnaces
A new 24-page catalog has just been released by the Detroit Rocking Electric Furnace Co. Bulletin Fd-271.

Steel Stock List
A handy pocket-size booklet containing an explanation of the change in steel classifications and extras, as well as general data tables, is now available through Joseph T. Ryerson & Sons, Inc. Bulletin Nb-106.

Alloy Steels
Why alloy steels are best for heavy equipment and other exacting applications is discussed in a folder by Bliss & Laughlin, Inc. A partial list of the more common grades gives machine ratings and turning speeds. Bulletin Jy-42.

Off the Payroll
"Deadweight is off the payroll with U.S.S. High Tensile Steels" is the title of a new folder issued by U.S. Steel. Contains not only technical information which is of particular interest to engineers but additional information of general interest. Bulletin Ib-79.

Cr-Ni-Mo Steels
A. Finkl & Sons' catalog is really a technical treatise on chromium-nickel-molybdenum steels for forgings. Pocket size, 104 pages, cloth bound, illustrated by photographs, charts and tables. Bulletin La-23.

Welding Ideas
Illustrating and describing a wide variety of money-saving repair, fabrication and structural applications of arc welding, a new bulletin "101 Welding Ideas for Low Cost Maintenance" is available through the Lincoln Electric Co. Bulletin Kc-10.

Globar Elements
Globar Pin Type Non-Metallic Electric Heating Elements and Terminal Rods and Globar "AT" Type Non-Metallic Electric Heating Elements are explained and illustrated in two booklets issued by the Globar Division of the Carborundum Company. Bulletin Lb-25.

Tool Steel Guide
A 36-page booklet which gives a clear picture of the entire range of tool steels and their fields of use, plus a systematic method for selecting the right steel for the purpose, is being released by Bethlehem Steel Co. Bulletin Bc-76.

Dust Collecting
Fourteen outstanding features found in Pangborn dust collectors, along with pictures of typical installations and savings, are found in the new Pangborn Bulletin. Bulletin Ad-68.

Chemicals
A complete line of Fluxes, Inhibitors, Zinc, Alkali Cleaners and Acids is described in a new catalog issued by Grasselli Chemicals Dept. of E. I. DuPont de Nemours & Co. Bulletin Dd-95.

Lectromelt Furnaces
The story behind lectromelt furnaces is well told in this 48-page booklet issued by the Pittsburgh Lectromelt Furnace Corporation. Tells of development of this type furnace and describes recent improvements. Bulletin Db-18.

Pyrasteel
All types of uses for Pyrasteel, the heat resisting alloy made by Chicago Steel Foundry Co., from astronomical plaques ruled 20,000 lines to the inch to huge kilns, are described in an illustrated pamphlet. Bulletin Cb-184.

Pot Furnaces
The new features of American Gas Furnace Co.'s improved pot hardening furnaces include insulating refractory lining backed by block insulation, heat resisting alloy burners, single valve control, numerous small burners with their attendant advantages, burner location and method of venting. Fully described in Bulletin Sy-11.

Alloy Castings
The "extra point" value of Michiana alloy castings is shown in a booklet released by the Michiana Products Corp. Typical installations are shown. Bulletin Nb-81.

Magnet Steels
A very handsome booklet describes the permanent magnet steels and castings made by Simonds Saw & Steel Co., including Alnico and Alnic. Bulletin Ba-158.

Welding Stainless
How to weld stainless steels is described in a colorful 12-page folder released by the Page Steel and Wire Division of American Chain & Cable Co., Inc. Bulletin Cc-86.

Carburizing Salt
A technical service bulletin describing a new development—Du Pont Carburizing Salt—for the economical production of deep high-carbon cases on plain carbon and alloy carburizing steels . . . available through Du Pont. Bulletin Dc-29.

Structural Metal
A complete and concise discussion of magnesium and its alloys is contained in the booklet "Industry's Lightest Structural Metal" which is made available through the Dow Chemical Co. Bulletin Bd-215.

Design
Designing greater sales appeal into products is explained in a colorful 8-page booklet for anyone who contemplates using, or is using, Stainless Steel, issued by the Carpenter Steel Co. Bulletin Nc-12.

Extrusions and Pressings
The book "Impact Extrusions and Pressings" showing many impact extrusions made of Alcoa Aluminum Alloys, for designers and production men, is available through the Aluminum Company of America. Bulletin Hc-54.

Furnace Experience
Facts developed through 32 years of engineering and building practically every type of industrial fuel equipment can be obtained through Flinn & Dreffein Co. Bulletin Bc-82.

Mo-W High Speed
J. V. Emmons, metallurgist for Cleveland Twist Drill Co. and largely responsible for the development of the molybdenum-tungsten high speed steels known as Mo-Max, has prepared a general description of these new steels. Bulletin Ka-103.

Colmonoy
The high resistance to wear and corrosion which distinguishes Colmonoy alloys and overlay metals is explained in a 4-page catalog released by Wall-Colmonoy Corp. Bulletin Bc-85.

Aerocase
A modern method for case hardening and heat treating steel in a liquid bath is provided by the use of Aerocase compounds. Their principal features are described by American Cyanamid and Chemical Corp. in an interesting booklet. Bulletin Oy-148.

Heat Resisting Alloys
Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Metal Heating
Improvements in furnace economies, operating conditions and appearance, furnaces that will more satisfactorily meet old requirements or handle new processes, service that will help solve the most stubborn problems are offered and described by Mahr Mfg. Co. in Bulletin Ea-5.

Mounted Wheel Chart
A convenient ready reference wall chart showing mounted grinding wheels should be of great advantage in the cleaning room, pattern shop, tool and die room, and many other places. It gives at a glance, by means of detailed drawings, actual size, the exact radius of each wheel and its exact shape. Chicago Wheel & Mfg. Co. Bulletin Bd-230.

Lubrication
Intensive research which completed important improvements in the field of heavy-duty gear and bearing lubrication is tabulated in a new 12-page illustrated bulletin released by D. A. Stuart Oil Co., Ltd. Bulletin Lb-118.

Closer Temperatures
Closer temperature control than is possible with any Mechanical Controller is explained in a 12-page illustrated pamphlet just released by Wheelco Instruments Co. Bulletin Nc-110.

Bright Annealing
Various types of electric and fuel-fired furnaces built by the Electric Furnace Co. for bright-annealing wire, tubing, strip and other products are described in an 8-page folder. Bulletin Lb-30.

Pure Metals
Pure, carbide-free metals are described and applications suggested in a pamphlet published by Metal & Thermit Corp., who make pure tungsten, chromium and manganese in addition to the ferro-alloys. Bulletin Ma-64.

Annual Index
The Annual Index of the Copper Alloy Bulletin published regularly by the Bridgeport Brass Company is now made available through this company. Bulletin Kc-163.

Machinability Chart
A quick and accurate picture of how Rustless Stainless Steel will respond to your shop operations is given in the "slide-rule" machinability chart available through the Rustless Iron & Steel Corp. Bulletin Bd-169.

Specialized Tester
The Rockwell superficial hardness tester is a specialized instrument for use where the indentation into the work must be kept shallow or of small area, yet sensitivity preserved. A supplement to Wilson Mechanical Instrument Co.'s catalog on the regular Rockwell tester tells all about it. Bulletin Sy-22.

Vacuum Cleaning
A very colorful brochure which illustrates modern cleaning methods by vacuum in industrial plants has been released by The Spencer Turbine Co. Bulletin Dc-70.

Ni-Cr Castings
Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Heat Treat Chart
Heat treaters everywhere should find a heat treating wall chart complete with S.A.E. specifications a very valuable addition to their shops. Published by Chicago Flexible Shaft Co., manufacturers of Stewart industrial furnaces. Bulletin Ka-49.

Steel Data Sheets
Wheelock, Lovejoy & Co. gives analyses, physical properties, heat treating instructions, and applications of Hy-Ten, Economo, and S.A.E. alloy steels in concise and easily usable form. Bulletin Ox-74.

Oil Burners
A new model proportioning oil burner giving accurate combustion and temperature control with greater fuel economy is described in a booklet by the Hauck Manufacturing Co. Bulletin Ed-181.

Portable Electric Furnace
A unique portable electric furnace designed for use at temperatures below 1100° F. with drawing salts and oil tempering baths is described in a booklet by Claud S. Gordon Co. Bulletin Ed-53.

Metallographic Equipment
The 100-page "Metal Analyst" issued by Adolph I. Buehler features new Metallographic Sample Preparation Equipment; a comparative listing of Metal Microscopes, Measuring Microscopes, and Spectrographs; an index of over 1000 new technical books and papers; and a treatise on the Application of Reflected Light. Bulletin Ed-135.

Strain Gages
A description of strain gages and extensometers handled by Baldwin-Southwark is included in an attractive bulletin just issued. Bulletin Ed-67.

Brazing Furnace
If you have a brazing problem you will be interested in the worth-while folder issued by Hoskins Mfg. Co. Bulletin Ec-24.

Cutting Oils
An interesting new booklet "Metal Cutting Lubrication—In Theory and Practice" has just been made available by Cities Service Oil Co. Bulletin Ec-113.

Ferrocarbo
A cupola addition, "Ferrocarbo", which improves casting quality, lowers costs and reduces rejects is described in literature available through the Carborundum Co. Bulletin Bd-57.

Ferro-Alloys
An interesting folder by Electro Metallurgical Co. tells all about their ferro-alloys and their special service to users which will help them to operate their furnaces and make alloy additions under the proper conditions. Bulletin Jy-16.

Precision Saws
The complete selection of DOALL precision saws supplied by Continental Machines, Inc., is shown in an attractive folder supplied by this company. Bulletin Ed-170.

Process Control
"Stabilflo Valves", an illustrated folder just issued by The Foxboro Co., describes this rugged, yet extremely accurate, valve for use in process control. Bulletin Ed-21.

Foundry Sand
A pamphlet recently issued on TAM Foundry Zircon Sand and TAM Zircon Flour contains detailed information on these products of the Titanium Alloy Mfg. Co. Bulletin Hc-90.

Moly in Steel
Metallurgists, engineers and production executives who are really interested in the metallurgy of steels and their application will want the excellent book on molybdenum steels published by Climax Molybdenum Company. Bound in loose-leaf manner, this reference book is chock-full of tables which form a volume almost an inch thick. Bulletin Hb-4.

High-Strength Steel Data
Complete mechanical property data on Ductiloy, a new low-alloy, high-strength steel, are given for strip, plate and bars in a folder of Great Lakes Steel Corp. Bulletin Ec-229.

Free Machining Steels
Speed Case and Speed Treat, two steels with increased machining properties, are described in literature available through Monarch Steel Co. Bulletin Cd-255.

High Speed Steel
Required hardness and extraordinary toughness combine to make Firth-Sterling Co. new high speed steel "Mo-Chip" of unusual interest to manufacturers who need a steel that is "practically indestructible." Bulletin Ad-177.

Heat Treating Hints
A helpful, colorful booklet edited by experienced heat treaters is available through the Lindberg Engineering Co. Bulletin Bd-66.

Electric Furnaces
A four-page bulletin on ⅛ lb. to 4 lb. high frequency melting furnaces and 3 kw. converter is now available through the Ajax Electrothermic Corp. Bulletin Dd-41.

Ingot Production
"The Ingot Phase of Steel Production" is the title of a book defining the principles of quality ingot production followed by many well-known steel manufacturers. Gathmann Engineering Co. Bulletin Ka-13.

Seamless Tubes
Prepared by the Timken Steel and Tube Division of Timken Roller Bearing Co. is a "Guide for Users of High Temperature Steels" which presents technical data relating to the various properties of Timken seamless tubes. Bulletin Bb-71.

Tocco Junior
A new induction hardening machine for hardening small parts is described in a new bulletin released by the Ohio Crankshaft Co. Bulletin Dd-145.

Heroult Furnace
Revised and expanded to include modern major innovations in the construction and operation of the Heroult electric furnace, the latest edition of the American Bridge Co.'s Heroult Electric Furnace Bulletin is available. Bulletin Bb-124.

Oil Burners
North American Mfg. Co. offers a bulletin describing improved low pressure oil burners, one type especially designed for automatic control and ideally suited for use with proportioning control valves. Bulletin Na-138.

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Carbide Grades Reduced From 150 to Four

Robbins Gives Other Interesting Facts and Figures on Cemented Carbides in Industry

By Kurt Siems

Cincinnati Chapter—Every so often one hears of an accident that proved to be beneficial rather than harmful, and such was the case when the Cincinnati Chapter, due to the inability of Dr. Zay Jeffries to fulfill a speaking engagement there, discovered another star in his substitute—namely, W. G. Robbins, president of the Carboloy Co.

As a "pinch-hitter" he not only acquitted himself to the fullest satisfaction of the audience, but in doing so, showed some real "home-run" qualities.

Seventy members and guests were present, amongst whom were a number of senior students of the University of Cincinnati under the leadership of J. F. Kahles, instructor in the Chemical Engineering Department of the University.

Machinability Group Meets

While this meeting was the seventh of a scheduled series of the Machinability Group of the Chapter, the regular monthly meeting was held in conjunction with it in order to permit the outgoing officers of the Chapter to turn their leadership over to the newly appointed men and to read the annual reports of the chairman, secretary, treasurer, and various committee chairmen.

In his talk on "The Role of Cemented Carbide in Industry" Mr. Robbins revealed many interesting facts and figures. On the inception of the use of cemented carbides for cutting tools, there was a scramble to produce grades that would do the "un-doable"—cemented carbide was something of a cure-all and unfortunately that was bad for the industry.

Approximately 150 grades of various carbides were offered to the trade and this was confusing to both the manufacturers of the material and the users.

Since then a process of standardization has taken place which has reduced the large variety until today four grades are doing universally throughout the United States about 85 to 90% of the metal cutting insofar as the product of the Carboloy Co. is concerned. Two grades out of these four are predominating.

Three methods are used in the manufacture of cemented carbides—the cold process method, the hot press process and the extrusion process.

Until this last method was adopted, carbide materials were available only in blocks, rectangular shapes, cylinders and the like. They are now offered in special shapes, in the form of drills for example (principally for the ceramic field), half round tubular sections, and extruded stock down to 0.015 in. diameter.

Extrusion Method Represents Advance

This extrusion method, Mr. Robbins mentioned, represents probably the greatest single advance in the processes used to manufacture carbide in the past four or five years.

The rapid advance made in industry with the use of cemented carbide tools is indicated by the consumption in 1939 in the U.S.A. of ten times what it was in 1935. Poundage per month today in the U.S. is greater than any of the yearly poundages of the years 1932, 1933 and 1934.

Simplification of the grade problem, machine tools which have kept pace with this new cutting material, a better knowledge of what to do and what not to do in tool and fixture design when using cemented carbide tools and how to sharpen such tools have all had no small effect upon the increased consumption.

Now Used to Cut Steel

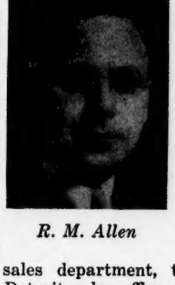
While cemented carbide tools were first used on iron and non-ferrous materials, they are now widely used for steel cutting, and it is interesting to note that foreign countries have stepped ahead of us there.

A great need for production, particularly in Germany, for rearmament purposes, increased the demand for cemented carbide tools there very materially. Their machines are mainly turret lathes or boring mills, however, and consequently their application of carbide tools came much easier and more quickly.

A number of slides showing various jobs on which cemented carbide tools are used rounded Mr. Robbins' talk off and made it one of the best presented to the Cincinnati Chapter this season.

HERE AND THERE WITH A.S.M. MEMBERS

THE new general manager of sales for Allegheny Ludlum Steel Corp., RUSSELL M. ALLEN, is an up-from-the-ranks man, and has been with Allegheny since the close of World War I, when, as a high school graduate, he served with the U.S. Army Field Artillery in France.



R. M. Allen

Joining Allegheny Steel Co. as a laborer, he was successively clerk in the Pittsburgh sales department, transferred to the Detroit sales office, then to Chicago as district manager of the western territory, and in 1934 returned to Pittsburgh as assistant general sales manager.

Following the merger of Allegheny and Ludlum, Mr. Allen was made assistant to the president of Allegheny Ludlum Steel Co., a position he held until his present appointment.

* * *

ANOTHER recent promotion by Allegheny Ludlum is C. B. BOYNE, to manager of stainless sales with headquarters located in Pittsburgh, Pa.

With the exception of one four-year period Mr. Boyne has been with Ludlum Steel Co. since 1913 when he started as a clerk. Between then and 1930 he was manager of the order and billing department, supervisor of warehouse stock control, and assistant manager of sales.

Returning to Ludlum in 1934 after a term as assistant sales manager for Associated Alloy Steel Co., he was made assistant to the president and then manager of stainless sales. After the merger with Allegheny Steel Co. he became manager of stainless bar and wire sales, the step before his present position as manager of stainless sales for the corporation.

* * *

FRED L. LAWRENCE has been appointed Detroit district manager for Copperweld Steel Co. of Warren, Ohio.

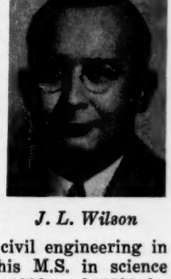
Mr. Lawrence attended the University of Michigan, and had previously been connected with the Frost Gear and Forge Co., Jackson, Mich., as chief metallurgist; Pittsburgh Crucible Steel Co. at Midland, Pa., as senior metallurgist; and later for the same company as sales engineer in the Detroit office, and most recently as both sales engineer and sales representative.

Carl F. Joseph, Chief Metallurgist, Saginaw Malleable Iron Division of General Motors Corp., Saginaw, Mich., Member of the Detroit Chapter A.S.M., Examines Parts Made From a New Alloy Known as ArMaSteel. This photograph appeared in the General Motors house organ, "GM Folks."

HARRY W. HIGHRITER, vice-chairman of the New Jersey Chapter, has resigned from the research staff, Lamp Division, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., to join the research staff of Fansteel Metallurgical Corp., North Chicago, Ill. He expects to transfer to the Chicago Chapter of the Society.

* * *

JACK L. WILSON, who comes to Peninsular Steel Co., Cleveland, as metallurgist, was formerly assistant metallographist in charge of alloy and tool steel laboratory at Bethlehem Steel Co.



J. L. Wilson

Mr. Wilson attended Clarkson Tech College and received a B.S. in civil engineering in 1927 followed by his M.S. in science in 1928. In 1937, 1938 and 1939 he attended Penn State Extension School of Ferrous Metallurgy.

* * *

FURTHER expansion in the sales personnel announced by Jessop Steel Co. of Washington, Pa., includes the appointment of PERCY W. FENNER to the Cleveland district.

Mr. Fenner, who is a graduate of the Case School of Applied Science, began his career as representative for William Jessop & Sons, later was Cleveland manager for Latrobe Electric Steel Co., and, before his present appointment, was sales representative for the Firth-Sterling Steel Co.

* * *

DUDLEY WILLCOX, treasurer and assistant general manager of the Ajax Electrothermic Corp. of Trenton, N. J., died on June 14, of complications following an appendectomy.

Graduating from Yale in 1908, Mr. Willcox worked for Tabor Mfg. Co. and then went to Princeton for graduate work. Here he met the late Edwin F. Northrup, with whom he helped form the Pyroelectric Instrument Co., later succeeded by Ajax Electrothermic.

From Golf Balls to Pig Iron York Learns Refrigeration Plays Part in Manufacturing

By A. Floyd Whalen

York Chapter closed its year on May 17 with a five-star final which included a plant visitation, an afternoon at golf, a supper at the York Country Club, an after-dinner talk on the manufacture of ice making machinery, and the election and installation of officers.

About 45 members journeyed through the plant of the York Ice Machinery Corp. in the afternoon. Guides described the highlights in the process of making ice machinery and its rapidly growing heir apparent, air conditioning. About five o'clock the crowd left for the York Country Club.

Here some of the members had been digging divots, throwing clubs, sinking unexpected putts, and occasionally looking up to see the little pill soaring down the fairway.

An enjoyable steak dinner was followed by a talk on some of the new developments in cooling and air conditioning by John G. Bergdoll, chief engineer of the York company.

After describing the principle and theory of refrigeration, Mr. Bergdoll launched out into some of the lesser known uses to which it is now put.

An air conditioning plant is rated on a per ton ice basis, that is, a one-ton plant will remove as much heat as would be required to melt one ton of ice, namely, 12,000 B.t.u. per hr. for 24 hr. A new installation at Washington for the national legislature is of 5,000 tons capacity.

Liquid center golf balls, Mr. Bergdoll said, are made by having the fluid frozen to —100° or better and wrapping the solid before it remelts. When it melts it expands and helps to tighten the cover and produce the extra resilience for which this type of ball is noted.

From these small articles we were taken to that modern monster, the blast furnace; here plants are installed so large that the 4000 or more tons of air sent through the furnace in one day is cooled sufficiently to precipitate moisture from it.

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Control of Factors Chief Development in Spot Welding Method

By J. W. McBean

Ontario Chapter—"Controlled Spot Welding" was the subject of the talk given at the May meeting by Harry Thomasson, welding engineer of the Canadian Westinghouse Co., Ltd.

This process is used largely in the production of automobiles, office and kitchen equipment, and has made the modern streamlined train possible. Its object is to produce uniformity both in holding power and in superior appearance, and this is attained by refining the *control* of existing factors, rather than by introducing new ones.

These factors are current, area, pressure and time, in addition to materials and design for the welding points and means for cooling the points.

Most operators considered that current control involved only a setting of devices with which every machine is supplied, but that only controls the secondary voltage, whereas the current delivered to the work is a function of both voltage and impedance.

The operator has, often unknowingly, considerable control over the impedance by the way in which he sets up his machine and spaces the leads. It was shown how this could lower the impedance, reduce the power, and still give the same current through the work.

Both current and pressure have to be raised as the weld area is increased.

Close Time Control

Most spot welds use *two to ten times* too long a current flow because of inaccuracy in the timing equipment. Referring to a large number of samples he had on display, which included aluminum down to 0.006 in. thick, lead down to 0.010 in. and brass down to 0.005 in. thick, together with such unusual combinations as galvanized iron to aluminum, and brass to stainless steel, the speaker stated that many of them could not have been done on a unit which had a time variation of plus or minus *one cycle* of 60-cycle current.

Such jobs could only be done by using electronic means to time the current impulse, and by closing and opening the power circuits by the use of huge rectifier tubes, without the use of any moving parts.

Varieties of Spot Welding

The speaker described the various forms of spot welding, including projection and seam welding, outlined their respective fields, and showed examples of modern applications.

While spot welding might be compared to riveting, in its field it is far more reliable when done under the controlled conditions outlined. Mr. Thomasson cited the case of an evaporator made of high strength silicon brass which contained over 400 spot welds wherein the failure of a single weld would mean the loss of the article. Though made of stock 0.037 in. thick and tested with compressed air at 200 psi. which applied a tremendous load to every spot, the average number of spot failures last year was only one out of every 268,000 welds made. Thus did the results justify the effort.

Help Wanted

LABORATORY ASSISTANTS and young men having thorough technical training but little experience: Naval Research Laboratory in Washington, D. C., looks forward to a decided increase in the work load, and will need more men for special problems. Civil Service standing not necessary; scale of wages from $35 to $75 per week. Address replies to Naval Research Laboratory, Anacostia Station, Washington, D. C., Attention of Clarence E. Jackson.

FURNACE ENGINEERS: Two men needed by industrial furnace manufacturer, preferably one having some past experience in furnace design. Box 6-5, American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio.

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